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Repairing Plato's Life Boat with Ockham's Razor

The Important Function of Research in Anomalies for Consciousness Studies

Abstract: *Scientific progress is achieved not only by continuous accumulation of knowledge but also by paradigm shifts. These shifts are often necessitated by anomalous findings that cannot be incorporated in accepted models. Two important methodological principles regulate this process and complement each other:* ***Ockham's Razor*** *as the principle of parsimony and* ***Plato's Life Boat*** *as the principle of the necessity to 'save the appearances' and thus incorporate conflicting phenomenological data into theories. We review empirical data which are in conflict with some presuppositions of accepted mainstream science: Clinical and experimental effects of prayer and healing intention, data from telepathy, psychokinesis experiments and precognition, and anecdotal reports of macro-psychokinesis. Taken together, the now well documented possibility of these events suggests that such phenomena are anomalies that challenge some widely held beliefs in mainstream science. On the other hand, scientists often fear that by accepting the reality of these phenomena they also have to subscribe to world-models invoking ontological dualism or idealism. We suggest accepting the phenomena as real, but without questionable ontologies commonly associated with them. We outline how this might work.*

I: Introduction
The Scientific Process and Two Regulative Principles

The sociology of science and the importance of anomalies

Since Kuhn's influential analysis of the scientific process (Kuhn, 1955) we know that science does not progress in a continuous stride by accumulating truths. Every now and then, anomalous data force scientists to give up on widely held

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beliefs and change scientific theories. Kuhn showed that such a process of theory change is discontinuous and resembles more a revolution than a smooth progress. Such paradigm changes only take place when enough anomalous data have accumulated so that old scientific models cannot give satisfactory explanations for them any more. Kuhn made a strong point in arguing that the underlying process is not rational but involves many seemingly irrational aspects from sociology and psychology of science (Feyerabend, 1976). In his analyses, Kuhn was foreshadowed and had also partially borrowed (Toulmin, 1985) from two important writers: Robin Collingwood (1998) and Ludwik Fleck (1980).

Collingwood had already pointed out in 1940 in his philosophical analysis of the scientific process that science necessarily rests on what he called 'absolute presuppositions'. These absolute presuppositions are necessary for the regular conduct of science. They are assumptions, for instance, about the ultimate constituents of the world, about how one should proceed in methodology, about values in science, and so forth. It is because new scientific models normally not only question an isolated theory but also those underlying presuppositions that the fight for a paradigmatic shift in science is at times harsh and not rational.
Fleck could show that what is called 'a scientific fact' is the result of a complex social process of scientists interacting, finding a consensus, being trained in a similar way and thus observing and seeing similar things. 'A scientific fact is due to the consensus to stop thinking', he says (Fleck, 1980).

The importance of the complex social, political and professional networks scientists are part of is described brilliantly by the actor-network-theory put forward by Bruno Latour and others, based on their empirical work (Latour, 1999; Latour & Bastide, 1986). From these analyses of recent scientific work in different areas of research emerges the picture of scientists interacting with colleagues, other human and non-human participants of the scientific enterprise, political and societal stakeholders, interest groups and funders. A scientific fact and the respective theories describing it are not a simple description of a reality out there, but a highly constructive process which results from the interaction of scientists with each other, the world and society at large. Hence, what part of our world is attended to is determined by the interest of groups and individuals in power, such as economic and political forces (Habermas, 1973), by competition for limited funds and social processes of communication within the scientific community and towards society.

The common denominator of these four intertwined ideas of the scientific process is recognition

(i) that scientific models rest on presupposition that are not themselves amenable to scientific scrutiny, except post-hoc in historical analyses,
(ii) that those presuppositions are not necessarily rational, but rather reflect the social consensus of a time,
(iii) that they are resistant to change because of their somewhat unreflected nature of silent collective consensus, and
(iv) that it is less a matter of what is 'real' than of what is socially acceptable and scientifically communicable that determines what counts as fact.

Anomalies that do not fit into existing models play an important role in this process (Laudan, 1981; Laudan, 1977): They point to blind spots and deficiencies in existing theories. Since our perception is normally geared to giving preference to information that is consonant with existing expectations, both individually and collectively, anomalies are prone to be overlooked, neglected or marginalised in their importance. Historically, two regulative principles that complement each other have been and ought to be employed to deal with an apparent anomaly within the context of a given scientific world model: The principle of parsimony, named *Ockham's Razor*, and the principle of taking phenomena seriously, which we call here *Plato's Life Boat*. We now turn our attention to those two regulative principles.

Ockham's Razor and Plato's Life Boat

Ockham's Razor is a well known methodological principle in science. It is named after the Franciscan friar William of Ockham (1285–1349?) who was renowned in his days for his trenchant criticism of traditional philosophy, theology and Aristotelian science (Leff, 1975; McCord Adams, 1987a; 1987b). Thereby he laid the foundations for the success of much of modern science (Crombie, 1953). The principle named after him as 'razor' is his principle of parsimony. It can be found in several places and varieties, one of which is '*pluralitas non est ponenda praeter necessitatem* — entities should not be proposed beyond necessity' (Wilhelm von Ockham, 1982, p. 59). He assumed this axiom-like principle as a rule against the scholastic theory of knowledge, which was derived from Aristotle, had been adapted by Thomas Aquinas and refined by Ockham's fellow friar and predecessor John Duns Scotus (Böhner, 1943; Brampton, 1965; Day, 1947). Briefly, the Aristotelian-scholastic theory of perception necessitated that the sense organs abstracted something from the percepts (Oeser, 1969), called a '*species sensibilis* — a sensible specimen' which was a kind of template, which again was transformed by the intellect into a '*species intelligibilis* — an intelligible specimen'. This, in the end, was the raw material the intellect worked with. This precluded any immediate kind of knowledge, either of sensible objects or even of inner states of the mind itself. Ockham opposed this view, criticizing the 'species' as unnecessary additional entities and thus stating his axiomatic principle of parsimony. Ever since Ockham's days it has been an axiom of scientific methodology to prefer more parsimonious models over more complex ones, and to be reluctant in adopting theoretical, invisible and derivative entities, like angels, forces, fields, or virtual particles, to name but a few candidates.

The methodological principle of parsimony, known as Ockham's razor, has a complement in what we would like to dub *Plato's Life Boat*. This is the principle stemming from the Platonic school of astronomy, probably introduced by Eudoxos of Knidos, stating that a theory has to be complex enough to 'save the appearances — σωζειν τα φαινομενα', which was a phrase pertinent to the Platonic academy (Duhem, 1965; Mittelstrass, 1962; Simplicius, 1893). Its original

meaning was that any astronomic theory should be able to explain the apparently strange behaviour of the planets. Thus, from a model-fit point of view, a refined Ptolemaic astronomical model fitted the data better — saved the appearances — than the circular heliocentric model of Aristarch of Samos, or later of Copernicus (Oeser, 1979a,b). It was only the elliptic model of Kepler which did both: explain the data better and more parsimoniously. Kepler's model, then, was one which both applied Ockham's razor successfully — put away with all the cycles and epicycles of the Ptolemaic model — and used Plato's Life Boat principle — saved all the appearances. It is interesting that this was only possible after the intermediate steps of

- Copernicus digging out or reinventing the old heliocentric model of Aristarch of Samos
- Galileo providing *new, conflicting* data by observing the moons of Jupiter
- Tyho Brahe's careful observation and data collecting of the planetary positions published later by Kepler in the Rudolphine Tables, the Tabula Rudolphina, including the ones that were at odds with any of the known models.

Observing and taking in account *all* data, especially data *conflicting* with accepted models, represents *Plato's Life Boat, the principle of rich observation*, as we might also call it. Finding a theoretical structure, which explains and understands *all* data, even conflicting bits of information, *without* taking refuge to *unnecessary entities* and thus applying Ockham's Razor, is the high art of theoretical modeling. It is accomplished by using both, Ockham's Razor, the principle of parsimony, and Plato's Life Boat strategy, the principle of taking conflicting data into consideration. Rich observation and wild speculation alone would lead to speculative theories postulating superfluous entities. Ether wind, phlogiston, animal magnetism, or N-rays are examples of entities postulated by violating the principle of parsimony (Alcock, 2003; Silver, 1997). On the other hand, an overemphasis on the principle of parsimony always bears the danger of overlooking important bits of information, because they do not fit well with existing 'parsimonious' models. Thus, both principles require each other mutually, and in good science are embraced with equal right.

Since the rise of modern science and the era of Newton onwards there certainly has been a bias towards parsimony, mostly through the success of reductive explanatory strategies (Agazzi, 1991). Normally, we distinguish between reduction of theories and reduction of phenomena. By reduction of theories we mean that higher level theories can be reduced to more fundamental and simpler theories, like biology to biochemistry, biochemistry to chemistry, and chemistry to physics with the goal to ultimately reduce all theories to physics. This program has, on a grand plane, certainly failed (Mayr, 1988; Primas, 1991), and is only operative within certain subdomains of scientific theories. Reduction of phenomena, however, is still well and alive and a prime motor of scientific discovery. By this we mean that apparent complex and puzzling phenomena can be explained as instances or examples of generic scientifically explainable

categories, by mapping of diverse and seemingly unrelated observations onto a common structure. Thus, light, lightning, magnetism, electric phenomena and nerve signalling all have been discovered to be instances of one underlying process, electromagnetism, and thus covered by one ultimate theory.

The modern scientific enterprise, using mostly Ockham's Razor, has been very successful. However, it runs into the danger of neglecting data and evidence not fitting into current models, by overly relying on the principle of parsimony. We would like to point out in this paper some areas of research and what we see as data conflicting with mainstream scientific models which have been cut out of the modern world view by applying Ockham's Razor. We opt for the alternative of taking this information and data seriously without falling into the trap of buying implicit interpretations which often accompany the data. Our argument will be that it is possible, rational, and even necessary to take these data into the focus of scientific scrutiny, that is to employ Plato's Life Boat strategy, without having to resort to animistic, dualistic or other purportedly 'unscientific' world models. It is our suspicion that an unwarranted marriage of scientific methodology with a particular world hypothesis — for most cases with a materialist-mechanistic hypothesis — has on the one hand created false preconceptions of what kind of phenomena merit attention as possible objects of scientific research, and on the other hand has hindered scientific progress towards a more encompassing world view.

II: Implicit Elements of a Modern Scientific World View

We suggest some implicit presuppositions of a modern scientific world view, underlying most of today's successful mainstream research being as follows:

- Single elements — like atoms, fundamental particles, molecules, genes, individual subjects — are primary. Complex systems — like atoms, molecules, cells, organs, humans, societies — can be analysed in terms of, and broken down into, its constituents without losing much information. This is the *atomist hypothesis* (Whitehead, 1978; Whyte, 1961).
- Changes are usually brought about by local impact of material parts, that is by efficient causation. Switching on the light, for instance, can be analysed in terms of a finger hitting the switch and starting a flow of electric current. This movement can be analysed in terms of muscle contractions, molecule movements and neuron discharges in the organism. What still defies this type of explanation is the question whether my conscious will is something distinct from this causal chain, or, eventually, will be discovered to be part of it. This is the *mechanistic hypothesis*. Another way of putting this is saying that causes have to be local causes (locality hypothesis), operating within a framework of signal transmission (Reichenbach, 1957). This locality assumption complicates the debate about the status of anomalies such as in parapsychology (see for instance Alcock, 2003, or Jeffers, 2003).

- Another tacit hypothesis, which often comes in line with these two, states that matter is primary and consciousness secondary to, derivative of, or supervenient on matter (materialistic hypothesis).
- Time is irreversible and ordered in sequence, progressing from past to future, with the future being partially open and the past fully determined. This hypothesis is a direct result of the second law of thermodynamics (time irreversibility hypothesis).

These four elements of a modern scientific world view seem to be, among others, the most basic common denominators subscribed to at least implicitly by most scientists.

We are not suggesting that these world hypotheses or presuppositions are wrong. It would not be meaningful to use the categories of truth and falsehood for absolute presuppositions. But this does not mean they are never to be questioned and their usefulness debated. If a different type of science, which necessitated the adoption of other presuppositions, was as successful as existing approaches in explaining the phenomena they can account for, and in addition could explain currently anomalous data, the pragmatic success of this new type of science would be a sufficient test for its acceptance. Thus, it is not useful to discuss these absolute presuppositions without recognizing their status as presuppositions (and not scientific truths), and their relative merits and limitations compared with other presuppositions. It is data which are the final arbiter of hypotheses. The point at which a corpus of data is strong enough to overthrow the validity of an existing hypothesis is largely a matter of temperament. Existing theories and paradigms have the tendency to remain in power until a better explanation for conflicting data turns up (Lakatos, 1978). This more encompassing theory cannot be found, however, as long as conflicting data are being ignored (Laudan, 1977).

We now turn to some anomalistic data, which we suggest should not be ignored in order to advance scientific understanding of nature at large and of consciousness in particular.

III: The Life-Boat Strategy: Anomalistic Data Taken Seriously

A direct consequence of the tacit presuppositions one and two described above is that a *direct*, *unmediated* interaction should not occur between one mind/brain system and another *distant* mind/brain system, or between a mind/brain system and a distant physical system. Action at a distance is a scientifically difficult notion, as was already realized by Newton (Stapp, 1990), albeit for completely different reasons. For Newton, who in the depth of his heart was still very much aligned with the alchemist tradition of science, the immaterial agent that mediated forces was of a spiritual nature, and the whole concept of gravitation was modeled along the lines of alchemist teachings of attraction and repulsion (White, 1997). This concept thus worked through the mediation of (spiritual) forces, and established locality through interaction of spiritual forces with matter. Although Newton was very secretive about his own reading of gravitational

forces, this can nowadays clearly be seen in a letter he wrote to Bentley, his closest friend and correspondent who he entrusted with his inner ideas. In 1692 he wrote to him that:

> It is inconceivable that inanimate brute matter should, without the mediation of something else which is not material, operate upon and affect other matter without mutual contact … That one body may act upon another at a distance and through a vacuum without the mediation of anything else by and through which their action or force may be conveyed from one to another is to me so great an absurdity that I believe no man who has in philosophical matters any competent faculty of thinking can ever fall into it (Newton in Turnbull, 1961, p. 253f).

In modern science, this problem is partially solved by introducing virtual particles, e.g. gravitons in the case of gravitation. But action at a distance between mind/brain systems or between a mind/brain system and a physical one *without* intermediate exchange particles is considered unscientific.

There are several strands of data strongly suggestive of the *possibility* of such an action at a distance. Before reviewing these in more detail, let us pause for a moment to consider the theoretical challenge. Absolute presuppositions implicitly follow an all-exclusive system: Either the suppositions 1 and 2 are applicable, and no such thing as direct interaction between mind/brain systems and physical or other mind/brain systems at a distance occurs *at all*. Or, if one single instance of such an action at a distance is documented, we at least know that these presuppositions do not encompass the whole story about nature. One single observation of action at a distance can refute a proposition (the locality hypothesis) that denies this possibility in general (Popper, 1976).

Thus, if we find empirical evidence for an occurrence of such a distant interaction, we have data which should be put into Plato's Life Boat and saved for an amendment of scientific world models. It should be noted in passing that finding a theoretical structure which encompasses both old theory and data plus new data conflicting with old theories is not a trivial task. But as soon as the Life Boat contains anomalistic data, it is a task that is certainly worthwhile, and is arguably a necessary undertaking.

1. Efficacy of prayer and distant healing

At least two studies have been reported recently in the medical literature suggestive of the effects of distant healing or prayer, along with some negative ones. In one of the studies (Sicher *et al*., 1998) 40 AIDS patients with progressive disease development were randomized in a matched pairs design to either receive distant healing or not. Distant healing was provided by different healers, each operative for one week per patient, over 10 weeks. Follow-up was after 6 months. The patients designated for healing were not aware that they were in the treatment group, and controls were not certain about not being in the healing group. Healers were located all over the United States, had no contact with the patients, and had only a photo of the healing subject available. Thus, personal contact was completely precluded. After follow-up patients in the treatment group had

significantly fewer and less severe AIDS defining diseases, fewer days in hospitals, fewer visits to the doctor and better well-being. Also, a multivariate measure of combined results was significantly better in the treated group. Since this study was rather small and thus bias could still play a role in distributing prognostic variables unevenly by chance among groups, this result should not be taken as definite. Bias, however, cannot be an explanation for the next study (Harris *et al*., 1999), which was a positive replication of a predecessor study (Byrd, 1988), and thus carries more weight. In this study 990 patients in an acute coronary care unit, mostly after acute myocardial infarction or severe coronary artery disease, were randomly allocated to a prayer group or not, without them knowing that they were in a study and being prayed for. Thus, no effects of conscious expectations could have operated. Those in the prayer group were prayed for by a group of 4 to 6 prayers who knew nothing about the patients except the name and the condition, had no contact and prayed for them over the course of 28 days daily. Patients were monitored by a series of clinical parameters relevant for cardiac patients, which were combined into one single summary score. Patients in the prayer group had a significant clinical improvement of 10% compared with the control patients, with length of stay being the same. This study shows that prayer can have an independent and clinically relevant effect which cannot be explained by psychological variables or bias. Another replication study found only a small, non-significant effect which would have taken 3000 patients to statistically verify (Aviles *et al.*, 2001).

Although the evidence for the efficacy of healing and prayer is not uncontested (Abbot *et al.*, 2001; Harkness *et al.*, 2000), there are enough positive results making the efficacy of healing a possibility (Abbot, 2000; Astin *et al.*, 2000). Let us be clear here that for theoretical purposes it is not necessary to demand that healing at a distance is an intervention of uncontested efficacy (which is rarely the case for most mainstream medical interventions anyway). It is only necessary to demonstrate that there is at least some evidence which is clearly and undebatably positive. Thus, we contend that at least in some instances action at a distance between mental and physical systems occurs and has been documented with sufficient methodological rigor to warrant this data to be conveyed to Plato's Life Boat.

2. Direct mental interaction between living systems

An experimental laboratory paradigm in experimental healing research is set up in the following way: Two subjects each are seated in two electromagnetically and acoustically shielded chambers, usually separated by a reasonable distance to preclude cheating. One of them, termed the receiver, usually relaxes for some 30 minutes, while his or her electrodermal activity (EDA), as a measure of autonomous arousal, is monitored. The other, denoted as sender, watches a computer screen which normally feeds back the EDA of the receiver in real time to the screen. He or she has the task of intentionally or mentally influencing the arousal level, as reflected by the EDA curve, towards a more relaxed or more aroused

state. Short intervals of the different directions of the intentional influence (either to calm or to excite) are arranged in a random and counterbalanced sequence, interspersed with rest periods. There is no direct, local way of influencing the receiver, and if a change in the receiver's arousal is noticed between activation and calming epochs this can only be an intentional interaction. A recent meta-analysis improved on the methodology of an earlier review (Schlitz & Braud, 1997), which had methodological shortcomings (Schmidt & Walach, 2000), and included new and so far unpublished material. It found significant results (Schmidt *et al*., 2004). Forty studies were retrieved and weighted for their methodological quality. The mean effect size is $d = 0.11$ ($p = .001$). This analysis shows that even using a sceptical approach, a small but significant effect can be found. We conclude that there are enough results fulfilling the requirement of having shown that such effects are possible.

3. Interaction between intentionality and random number generators – micro PK

Ever since the beginning of parapsychological research there has been the question whether random events in the material world can be changed by human intention, without direct manipulation. Since the advent of random number generators from electronic or radiation sources there have been numerous studies addressing this question. Part of the database has been summarized by a meta-analysis (Radin & Nelson, 1989). Different sources of random events have been used, mostly radiation sources or zener-diodes creating true random noise, and in diverse protocols which include the intention of achieving upwards and downwards deviation from chance expectations, small but robust effects have been found which are statistically highly significant. These effects are exceedingly small – $r = 3*10^{-4}$ – , but accumulated over millions of trials they testify at least to the possibility of direct interaction between mental systems – intentions – and physical systems. A recent analysis of experiments conducted since the publication of the meta-analysis strengthens this result (Radin & Nelson, 2003) while a different meta-analytical approach yielded conflicting results (Bösch *et al*., 2004). It is not at all clear what actually drives the effect, since a recent large scale replication using traditional statistics was totally negative (Jahn *et al*., 2000). Yet, even from that database, using refined statistics, anomalous deviations from randomness have been demonstrated (Atmanspacher *et al*., 1999; Pallikari, 2001). Thus, it is plausible that at least sometimes such direct mental influences of human intention on random processes are possible.

4. Precognition

Precognitive events have been documented throughout the written record of human culture (Braude, 1987; Zohar, 1982). By precognition we mean that events to happen in the future can be fully or partly known beforehand, either by visual images and dreams or by intuitive action (Burns, 2003). This is a strong challenge to the time-irreversibility assumption of modern science. Precognitive

dreams form large samples of both American and European case collections of extrasensory perceptions (see e.g. Irwin, 1999, chapter 3, for an overview; Krippner *et al*., 1971, for an example of an empirical study). There have also been enough experimental studies to warrant a meta-analysis. In these studies people were forced to choose between a series of forthcoming events, e.g. in card-guessing experiments before a card had been turned. A meta-analysis of such forced-choice precognition experiments (Honorton & Ferrari, 1989) showed a clear and significant effect. Three hundred and nine studies with more than 50,000 subjects and nearly 2,000,000 trials yielded a small but reliable effect of $r = .02$. The according Stouffer's Z is $z = 11.41$ ($p = 6.3 \times 10^{-25}$). In an ingenious protocol Radin (1997), using subjects as their own control, showed them highly arousing and emotionally relaxing pictures from a large database in random sequence on a computer screen. He measured EDA as an indicator of autonomous arousal. This measure reflected, as expected, a strong effect of heightened arousal after presentation of the emotionally disturbing pictures, and a much smaller one after emotionally soothing pictures. What was totally counterintuitive, however, was the fact, that the EDA-curves showed a distinct and reproducible peak *before* the actual physical onset of the disturbing — but not before relaxing — pictures. This seemed to be something like a precognitive orienting reflex. Bierman (2000) also examined databases of conventional experiments, such as a gambling experiment to discover subconscious concept formation (Bechara *et al.*, 1997), subjects' reactions to phobic stimuli and other types of psychophysiological data and could also find evidence for the same precognitive peak.

The database is thus broad enough to establish precognition as something which does sometimes occur, and in our view this is sufficient warrant for its being taken up by Plato's Life Boat.

5. Telepathy: Research in the ganzfeld

One of the most prominent parapsychological experiments are the so-called ganzfeld studies (Utts, 1991). These experiments have been described and discussed recently (Palmer, 2003; Parker, 2003). In such telepathy experiments, two participants are placed in different, usually electromagnetically shielded rooms in the laboratory, thus precluding all ways of conventional information transfer. One person, called the receiver, is placed in a field of homogenous vision and sound of mild sensory deprivation, the so called ganzfeld. The other person, called the sender, watches repeatedly a short video clip or a static target image while he or she is able to listen to the verbal mentations that are produced by the receiver in the ganzfeld state. Then four stimuli, one target and three decoys, are presented to him or her and the target has to be identified. Tests are against the chance expectation of 25 % hit rate.

The methodological rigour of ganzfeld experiments was subject to a debate that ended with a joint communiqué proposing guidelines to guarantee high methodological quality in future studies. Studies according to these guidelines

have been performed by Charles Honorton (Bem & Honorton, 1994). In 10 studies with 329 sessions, they obtained an average hit rate of 32% ($z = 2.89$, $p = .002$; chance expectation would be a 25% hit rate), the corresponding effect size being $r = .22$. Exceptionally an artistically gifted sample of 20 students from the Julliard School in New York showed a hit rate of 50%.

However, a meta-analysis of new experiments since 1987 showed no overall effect (Milton & Wiseman, 1999). This result was disputed, since with some methodological fine tuning a significant effect can be shown (Milton, 1999; Schmeidler & Edge, 1999). The latest meta-analysis of all studies since the joint communiqué in 1987 demonstrates again a significant finding (40 studies, hit rate 30.1%, effect size $r = .05$, $p = .005$), because another very large study has been conducted since the last meta-analysis (Bem *et al*., 2001).

From the current state of our knowledge it is hard to establish ganzfeld telepathy as a fact. Nevertheless, there are too many studies with positive findings to negate the fact that at least sometimes this type of telepathy is possible. We think the data are challenging enough to place ganzfeld telepathy into Plato's life boat as well.

6. Macro psychokinesis, spook and poltergeist phenomena

The aforementioned phenomena have in common that they have been investigated using sound methodology and quantitative methods, and have shown some replicability. On the other hand, the effects are rather small, and it is difficult to envisage any practical implication, except in the case of intentional healing. Thus, they are mainly interesting from a theoretical point of view as fostering instances of phenomena which should not happen by the standards of the modern world view but still do (Braude, 1978; 1986). Apart from that there is a category of events which are much more impressive, in that they are really obvious in the macro-world, have direct impact, but are less replicable and reliable, and highly elusive. These are instances of macro-psychokinesis (macro PK), often termed spook or poltergeist phenomena, or other forms of spectacular singular episodes of paranormal information transfer. They do not seem to obey any laws or discernible structures, and by that token they are the most elusive of all paranormal phenomena, where elusiveness is the hallmark of these phenomena anyway (Parker, 2003). Moreover, public attention has sometimes lured subjects involved in such cases into fraud if the phenomena were not operating at the command of the media or other witnesses. This has discredited the whole area of research. While it is certainly necessary to remain highly alert to the possibility of fraud and faking in many cases (Wiseman & Morris, 1995), there still are some cases which do not seem to lend themselves to such explanations. The Freiburg Institute of Frontier Areas of Psychology and Psychohygiene (IGPP) collected many hundreds of such reports under its late director Professor Bender (Schellinger, 2000). There even seems to be a uniform phenomenology (Lucadou, 1995; Moser, 1980).

It is in the very nature of these cases that they can never overcome their status of being anecdotes or lore. But anecdotal accounts vary in credibility and in this instance it is worth recalling that the eminent German physicist Wolfgang Pauli was a notorious source of such macro-PK events. It is not uncommon for such phenomena to become attached to the names of a number of celebrities by way of 'urban myths', but in Pauli's case the occurrences are well documented by credible living witnesses who knew him personally, and he himself took his so called 'Pauli- Effect' very seriously (Pietschmann, 1995; Enz, 1995). Pauli himself felt that these macro-PK effects were probably due to his inner psychological conflicts. Through the realization of his personality problems and their solution Pauli developed a strong conviction that physics would only be complete if it took into consideration consciousness as a part of reality (Meier, 1992; von Meyenn, 1996; Pauli, 1954). Therefore he stated the necessity of accounting for mentality in a physical theory (Pauli, 1952). It seems to us, therefore, that the occasional possibility of macro-PK should at least also find a place in Plato's Life Boat.

The phenomena recounted so far are all instances challenging basic tenets of prevailing modern world views. Thus they fulfill the criterion of being anomalistic data which are not incorporated in modern theories (Alcock, 2003), and which might give rise to more complete theories, just as much as, for instance, the anomalies in the planetary orbit of Neptune gave rise to the discovery of Pluto, or the anomalies of the precession in Mercury were covered by relativity theory. The difference is, however, that these phenomena are not only anomalistic, but that they also seem to belong to different categories.

The reluctance of modern scientists to accept such anomalistic phenomena as real is not only that they do not fit into a prevailing world picture, but also that they seem to come with a theoretical framework in tow, namely ontological dualism or parallelism (Beloff, 1987) which is considered outdated. We make a plea not to overlook the data for fear of buying an unwanted theory. And this is where Ockham's Razor might repair Plato's Life Boat.

IV: Repairing Plato's Life Boat with Ockham's Razor — A Place for Macroscopic Non-Locality

Taking phenomena seriously is one thing. Using them as a 'proof' to support certain world hypotheses is quite another. What should have become clear by now is that we argue for the first alternative, and opt for a critical evaluation of all world models. It is a hallmark of mature and postmodern science, after all, to realize that there can be a multitude of theoretical structures mapping a given array of data, and that the criteria by which to choose a model are ultimately subject to many influences (Collins & Pinch, 1993; Feyerabend, 1976). None of the above mentioned phenomena entail, for instance, a dualist ontology, proving consciousness to be a separate ontological entity, although this is a possible option, too. But all potential models would have to account for a direct, i.e.

nonlocal interaction between different mind/brain and physical systems. For this is the commonality of most of the above mentioned phenomena.

On the other hand, it seems obvious that none of these phenomena can be explained within a completely reductionistic, materialistic monist ontology. One might argue that such phenomena could arise through emergence (see e.g. van Gulick, 2001). For if consciousness is emerging in some unknown way from physical processes so might Psi. Thus emergentist theories might be the most parsimonious Life Boat conceivable. While this approach sounds promising and fruitful at the first glance, we do have some objections. First, explaining the unknown (Psi) by a process that in its details is itself unknown (emergence) is neither an explanation nor parsimonious. Our second objection is that emergence cannot solve the most prominent feature of the reported Psi phenomena, i.e. *nonlocality*. While there might be a solution for the mind/brain interaction and the pending problem of downward causation within one mind/brain system this would not explain interactions between systems that are distant in space (or time).

Thus these phenomena demand as a common denominator a place for *non-locality* between macroscopic systems, and an *equality* — in the sense of non-reductive equality and ontological reality — between material and mental systems. What would save a monist ontology would be the hypothesis that the basic stuff of the universe is neither matter nor consciousness after all, but some transcendent element which is basic to matter and mind at the same time and in the same way. This world model is, as we see it, at the base of the neoplatonic philosophy of Plotinus, if understood correctly and not in an idealist interpretation. It was again brought forward by Spinoza, used by Jung, and has been endorsed in the modern era by several authors (Atmanspacher, 2003; Elitzur, 1991; Fahrenberg, 1979; Feigl, 1958; Kirsch & Hyland, 1987; Velmans, 2002; Walach & Römer, 2000). We need a model, in sum, which takes consciousness not as a derivative of matter, but as an entity equal in ontological status to matter, but not necessarily by way of an ontological dualism, but certainly as a phenomenological dualism, as recently expounded by Chalmers (1996). Such an approach would not necessarily demand exotic kinds of energy or unknown types of fields, although even this could be the end of the story, if empirically validated. But what would indeed be required as a minimum common denominator is a formalism which allows for non-local correlations between any kinds of systems independent of time and localization in space, of make-up and size. Quantum non-locality as exhibited by EPR-like correlations or quantum entanglement (Cushing & Mcmullin, 1989) could be an instance of a more generic type of non-locality that may be a good candidate to meet the requirements.

We have outlined such formalism elsewhere as Generalised or Weak Quantum Theory (WQT) (Atmanspacher *et al*., 2002). Briefly, WQT employs an algebraic axiomatic approach which uses only the most basic and general formal structures characteristic of quantum mechanics, while omitting more specific definitions. For instance, it does not provide a definition of addition and subtraction and thus cannot make precise probabilistic predictions. However, it defines

multiplicative operations, both commutative and non-commutative, and hence accounts for the most central feature of quantum mechanics, namely its non-commutativity, which is the algebraic expression of complementarity (Kim & Mahler, 2000). A natural consequence of complementarity is entanglement between sub-elements of a system (Zeilinger, 1999). More precisely, whenever complementarity between global and local observables of a system holds, entanglement between the elements described by the local observables ensues. While in quantum mechanics proper the amount of non-commutativity, and hence the degree of entanglement, is defined by Planck's constant, no such definition and restriction is provided by WQT. The formalism of WQT could in principle be used to describe other than quantum systems, and quantum mechanics proper can be recovered from WQT, if some restrictions and definitions are introduced.

Hence, WQT is *one* example of a theoretical structure that is able to account for non-local processes such as those observed in the phenomena described above, without making additional assumptions, postulating strange entities, unknown fields or occasional violations of natural laws. On the contrary, it uses one of the strongest theoretical structures available, namely quantum theory, and maps the phenomena in question on this structure. The only assumption made hereby is that the formal structure responsible for entanglement within quantum mechanics proper, namely non-commutativity or complementarity of global and local observables, can be meaningfully applied to other systems also and would then account for a generalized form of entanglement. This is a theoretical prediction made from WQT, which, however, could eventually explain the anomalistic data in question and thus lead to a positive definition, the lack of which is one of the reasons for skeptics to sink the life-boat completely (Alcock, 2003). At the moment, this is only a theoretical option, which needs experimental verification, although some positive hints have been provided (Wackermann *et al*., 2003; 2004), and it is by no means implied that WQT is the only theoretical option, another example being the Model of Pragmatic Information (Lucadou, 1995) which places more emphasis on the informational content of a system.

However, what is implied is that any theoretical concept needs to take into account the non-local nature of the phenomena in question. WQT and generalized entanglement is just one way to go about the task that uses both Ockham's Razor and Plato's Lifeboat, saves the phenomena while at the same time connecting the attempt to mainstream theorizing. Such a non-local approach that treats those phenomena as instances of a generalized form of entanglement would at the same time also account for the proverbial elusiveness of those phenomena and the lack of robust replicability: Any phenomenon based on entanglement, proper or generalized, cannot be used to transmit a causal signal, except in special instances, where a parallel classical channel of information flux is established, like in experimental models of quantum teleportation or encryption. Hence, any experimental model that does not give proper consideration to this fact will be doomed to failure, except perhaps on a large statistical basis, and hence convey the image of irregularity (Alcock, 2003). We probably have to

introduce an analogue to Eberhard's theorem (Eberhard, 1978) that prohibits signal transmission by entangled quantum systems (quoted in Burns, 2003).

What needs to happen for this theoretical strategy to find broader acceptance, apart from a solid experimental data base? Researchers and writers need to become aware of the implicit presuppositions, namely their bias for local explanations. Those phenomena will never be successfully explained by local theories, except in a reductive way (Brugger *et al*., 1994; Persinger & Makarec, 1987), simply because the phenomena do not seem to be local. However, local thinking is deeply entrenched, and many people cannot even conceive of a concept of causality or regularity apart from the restricted notion of local causality.

In strict analogy to quantum theory such non-locality does *not* have to involve signals, energy transfer, violation of symmetry principles or invariances, but can work in a totally correlational fashion without postulating a new, different or exotic mechanism for it to occur. Thus the task is to find theoretical structures incorporating the phenomena without automatically subscribing to the implicit world hypotheses which are normally associated with them by advocates of anomalistic phenomena, who very often also subscribe to localist ontologies. Again Ockham would be a good guide. He already postulated a notion of causality which was not essentialist in the sense of Aristotle's notion of efficient causality, but purely correlational in the sense that smoke is a signal for fire (Goddu, 1984). His axiomatic definition of cause is the following: 'This is a cause of a thing or event: If it is not present, while everything else is present, the thing is not. If it is present, the thing or event is.' (William of Ockham, 1957, p. 629f; Translation ours; we have translated the Latin noun '*res*' as 'thing or event', since *res* is more than just a thing.) This led him to accept action at a distance, or macroscopic non-locality in our terminology, as a more sober proposition than the scholastic notion of intermediate species, or the modern view of locality for that matter. In the same vein we propose to let go of the obsession with prejudices like locality, and to let the phenomena speak. A model combining both strategies, like WQT, saving the phenomena and being parsimonious at the same time needs to adopt macroscopic non-locality as a hypothesis and work on it. Ockham would have liked it. And it fits the data best.

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